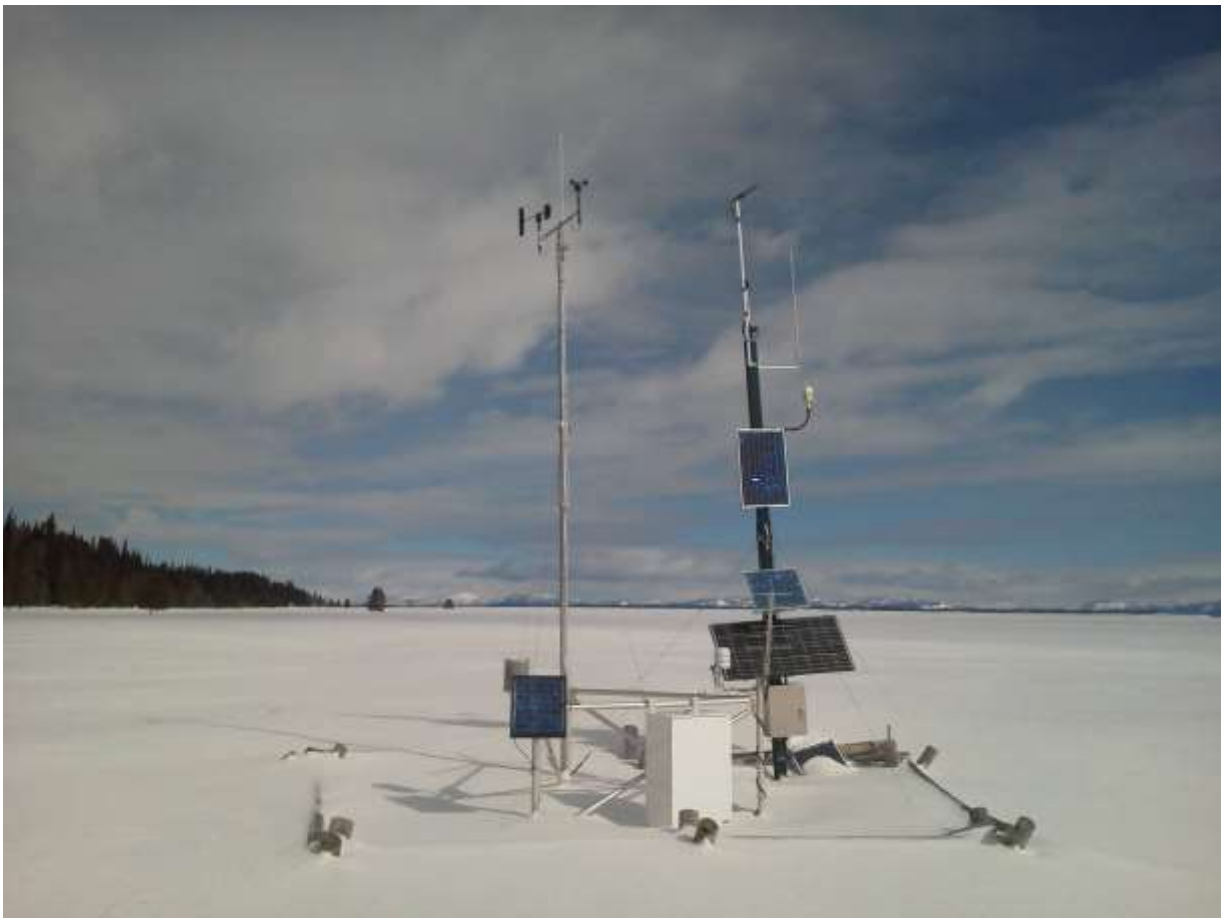
Teton Interagency National Fire Danger Rating Operating and Preparedness Plan

2015



The National Fire Danger Rating System (NFDRS) assists fire management personnel in planning and implementing preparedness and staffing levels within their respective units. Fire danger ratings describe the potential within a geographic area for a fire to start, spread and require action. NFDRS is a tool for fire managers to correlate fire danger with fire business decisions.

Fire danger ratings and specific fire behavior predictions are not the same. The NFDRS is a planning tool used for a large area (Fire Danger Rating Area, or FDRA) to predict under "worst case" conditions the potential for a fire to start, spread and require management actions. NFDRS does not account for real time conditions such as rate of spread, fireline intensity, crowning, etc, which are all site-specific conditions.

This plan's objective is to provide procedures by which NFDRS will be utilized and implemented by Grand Teton National Park and the Bridger-Teton National Forest within the Teton Interagency response area:

- Define roles and responsibilities related to NFDRS and fire weather observations in order to make fire-planning decisions, manage weather information, provide weather forecasts, and brief fire personnel
- Describe the Remote Automated Weather Station (RAWS) network on the Forest and Park within the local Fire Danger Rating Area
- Establish procedures and time frames for initiating, obtaining and inputting data into the Weather Information Management System (WIMS)
- Determine the appropriate fire danger rating indices and thresholds
- Provide a pocket card and a preparedness and staffing plan based on NFDRS indices
- Ensure that administrators, fire managers, fire management resources and the public are notified of the adjective fire danger rating and local preparedness levels

Roles, Responsibilities and Tasks

BTNF and GTP FMOs:

- The FMOs are responsible for implementing and updating this plan and ensuring the information is disseminated to other Fire Management personnel.

Agency Duty Officer:

- Coordinates with appropriate staff and Zone Duty Officers, to evaluate if daily fire danger and staffing levels are appropriate and adjust accordingly.

Zone Duty Officer:

- Provides input regarding preparedness and planning levels.

- Assures that all local fire resources and other unit staff are aware of fire danger and planning levels.

Interagency Dispatch:

- Ensures timely editing of daily weather observations and monitors actual indices.
- Recommends changes to daily staffing levels to the Forest and Park Duty Officers.
- Broadcasts daily fire weather forecasts issued by the National Weather Service, Riverton, WY. Dissemination includes daily radio broadcasts at 1100 and 1600 hours during the established fire season with additional forecast "warnings" when necessary.
- Broadcasts daily NFDRS indices and posts the indices on the Teton Interagency Fire web page.

Forest Assistant Fire Management Officer and Park Assistant Fire Management Officer (or designee):

- Assembles seasonal risk information such as live fuel moisture, 1,000-hour fuel moisture, fuel loading, and NFDRS trends. This information will be distributed to TIDC and local fire personnel and posted on the Teton Interagency Fire website
- The Forest and Park AFMOs will coordinate the overall weather station management and supervise maintenance of network RAWS. The following technicians are assigned as primary technicians.

Hoback	Mike Cahill
Half Moon	Mike Cahill
Raspberry	Mike Cahill
Snider	Mike Cahill
Burro	Eric Neiswanger
Kelly	Dwayne Gibbons
Grand Teton NP	Paul Clement
Portables 1-4	Lesley Williams

- The BT Forest AFMO and Grand Teton Fire staff will ensure that pocket cards are prepared on a bi- annual basis and updated per NFDRS standards. The cards will be distributed to all local and incoming firefighters as well as overhead.

Local RAWS technicians:

- RAWS technicians will be responsible for yearly maintenance of stations. Yearly maintenance will be completed by the established due date in WFMI.
- Technicians will be available during the field season as appropriate to troubleshoot any RAWS problems.
- Technicians will be trained and available as appropriate to set-up the portable RAWS stations.

All Wildland Fire Resources:

- It is the responsibility of all wildland fire resources to be aware of the preparedness/staffing level, daily fire indices and their responsibilities or actions to be taken at each level.
- Each module's first line supervisor is responsible to provide and brief their personnel on the information contained in the TIDC pocket cards.

Remote Automated Weather Stations (RAWS)

There are seven permanent operational RAWS located in the Teton Interagency area. Each of the RAWS locations was selected to be representative of the primary fuel model used for inputs into NFDRS and representative of the general weather conditions. Figure #1 displays the stations location and Table 1 summarizes the station information.

Anderson Ridge on BLM land south of the Wind River Range is sometimes used to monitor weather on the south end of the Forest. The BT abandoned the Big Piney and Blackrock stations in the mid 1990's, and Snider and Burro replaced them respectively. The Park abandoned the Moose manual station at that same time, with Grand Teton RAWS replacing it.

The BT and Grand Teton also maintain four portable RAWS stations with satellite transmission capability. The stations are located at the Interagency Fire Cache in Jackson.

Figure 1: TIDC RAWS stations, elevation and station number

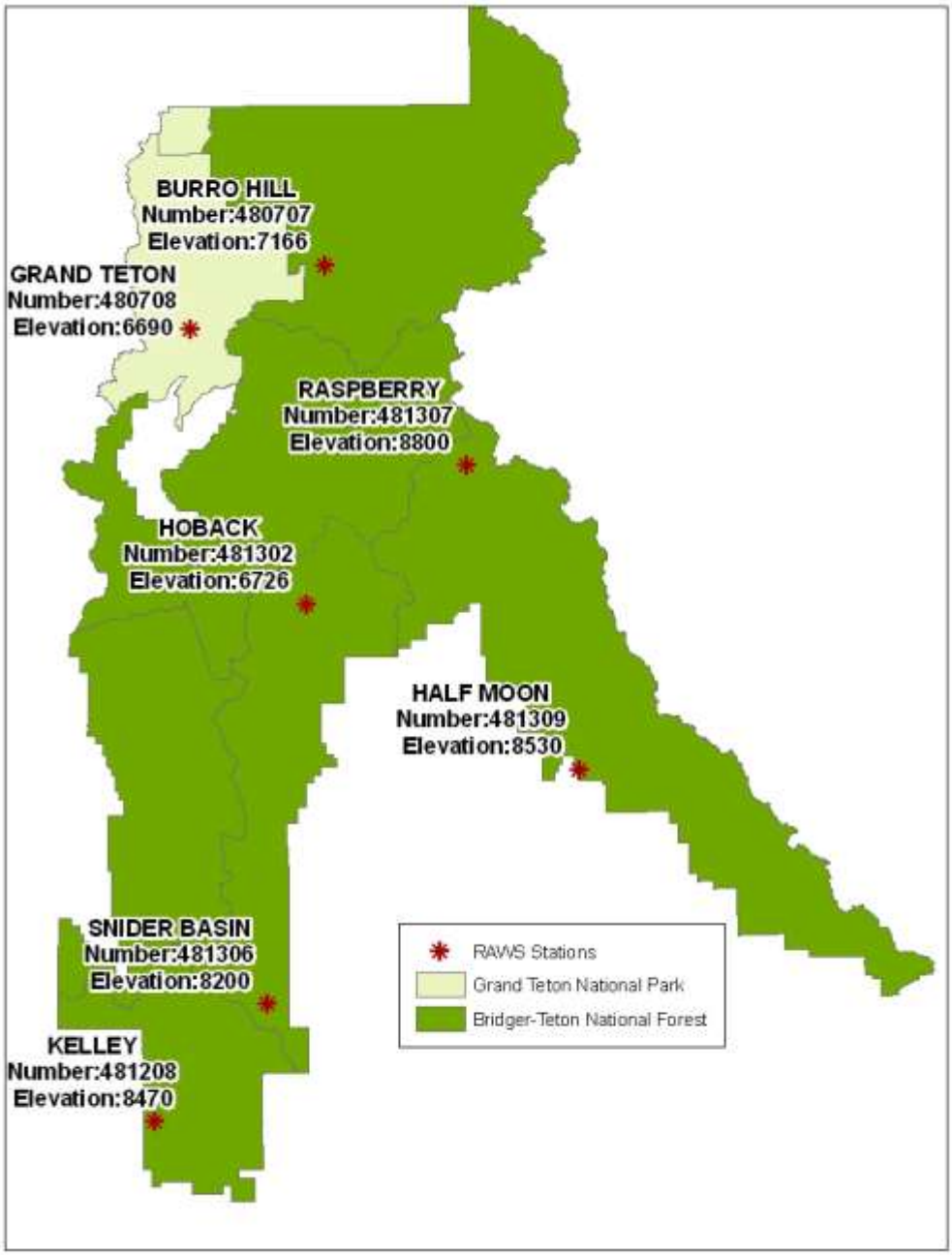


Table 1

Western Wyoming RAWS stations

Name	Number	Elevation	Location	Latitude/ Longitude
Hoback	481302	6726	T38N R113W S32	43.2203 -110.4231
Snider	481306	8242	T29N R115W S9	42.4908 -110.5267
Burro	480707	7166	T45N R113W S24	43.897 -110.3708
Raspberry	481307	8800	T41N R110W S35	43.4722 -110.0183
Half Moon	481309	8530	T34N R108W S16	42.9136 -109.7461
Grand Teton	480708	6710	T43N R116W S1	43.7236 - 110.7103
Kelley	481208	8180	T26N R117 ½ S1	42.2761 -110.8061
Anderson Ridge(BLM)	481903	8120	T29N R191W S31	42.7039 -108.940
Diamond Flat (Caribou, currently out of service)	103904	7500	T6S R45E S29	42.8667 -111.2167
Blackrock (abandoned)	480701	6890	45N R112W S30	43.831 -110.3440
Big Piney (abandoned)	481301	6820	30N R11W S31	42.5214 - 110.0997

WIMS and NFDRS Operational Procedures

Weather Station Operations

Teton Interagency Fire follows the "Great Basin Strategic Plan for NFDRS and Weather Station Operations" and utilizes the 1978 version of the NFDRS including the NFDRS guidebook.

Teton Interagency Dispatch, with guidance from the Forest and Park AFMOs, is responsible for completing the following annual start-up, green-up and freeze adjustments:

Table 2

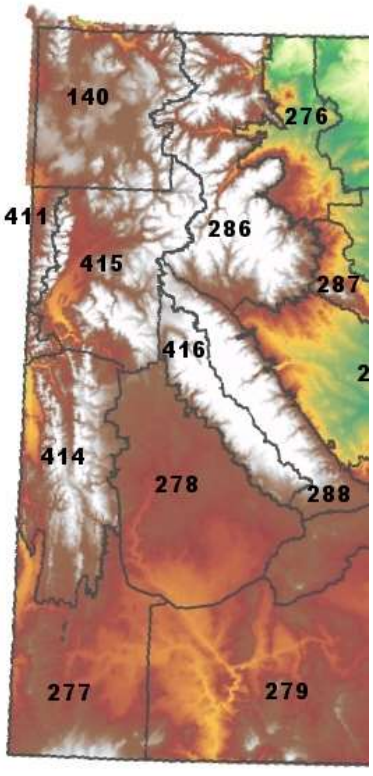
Date	Task
April 1	Begin entering daily observations
	Determine if KBDI default start-up of 100 is appropriate
	Determine if 1,000 fuel default start-up of 25 is appropriate
April 15	Pre-green all stations
Approximately May 20 to June 10	Green-up of individual stations as indicated
After September 1, when 3 days of consecutive <28 degree minimum temperatures	Freeze-up individual stations as indicated

Fire Danger Rating Areas (FDRA)

A Fire Danger Rating Area (FDRA) is a large area with defined boundaries in which there are similar fuels, weather and topography. The Bridger-Teton National Forest and Grand Teton National Park form one FDRA.

In 2007, a "Special Interest Group" (SIG) was established to represent the overall fire danger for the Bridger-Teton and Grand Teton areas. The SIG produces fire danger index values weighted equally between Grand Teton, Half Moon, and Snider RAWS stations.

In addition, Fire Danger Indices will be calculated for each of the seven RAWS stations and the areas they represent.



Fire Weather Zones

The Teton area includes three fire weather zones; Zone 414 is the southwest half of the BT, Zone 415 includes the north half of the Forest, and Grand Teton National Park, and 416 is west side of the Bridger Wilderness. Fire weather forecasts are produced for each zone by the Riverton National Weather Service Office and are available online at:

http://www.weather.gov/riw/fire

NFDRS Fuel Models

NFDRS Models G and T represent the majority of the fuels in the Teton area and they have been chosen to simplify information provided to on-the-ground firefighters. Model G represents the conifer forest types, and T

represents the sagebrush model types. Model G is considered the benchmark fuel model, while T is an indication of the sagebrush/grass models that cure later in the season.

The complete fuel models used in WIMS are:

78 version G3P3
78 version T2P3

Fire Danger Ratings and Indices

Fire danger ratings were developed to measure the potential for a fire to ignite, and then spread and require management action. Fire danger ratings are the result of analysis comparing current weather data with historical fire records. Results of the analysis provide the user with two forms of information:

The Adjective Fire Danger Rating breaks the fire danger into five levels: Low, Moderate, High, Very High and Extreme. The primary use of this rating is for public awareness and prevention. Except under unusual circumstances, the adjective fire danger will be the same Forest and Park-wide. WIMS produces a daily adjective danger rating. Based on the WIMS output, the Forest and Park Duty Officers may jointly agree to adjust the danger rating as appropriate.

Indices and Components include the Ignition Component the Energy Release Component, the Spread Component and the Burning Index. Indices and Components are calculated each day for all fire danger rating areas. These indices are further summarized into Staffing Classes based on a statistical distribution of their historic values. The Teton Area uses a six class system (I, II, III-Lo, III-Hi, IV, and V) to define the current staffing class.

Energy Release Component has been selected as the fire danger component for preparedness planning and staffing. ERC provides managers with a smoother index that normally does not change drastically on a day-to day basis. Fire managers need to understand that ERC does not consider the short-term effects of wind on daily fire danger. Based on the 1993-2012 Teton SIG data, approximately 95% of large fires (those over 50 acres) occur when ERC is 30 or higher.

Figure 3

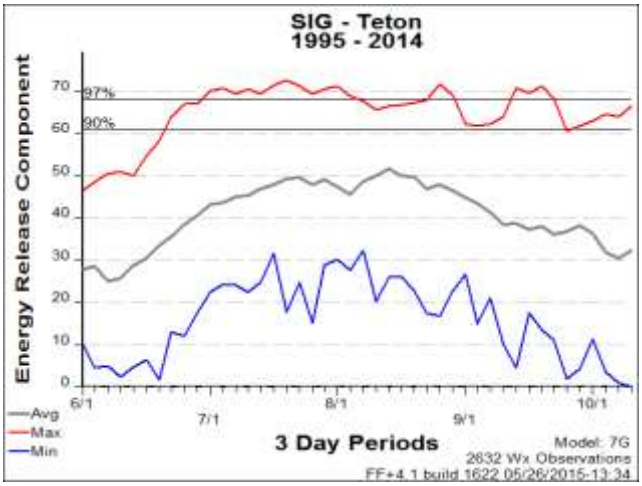
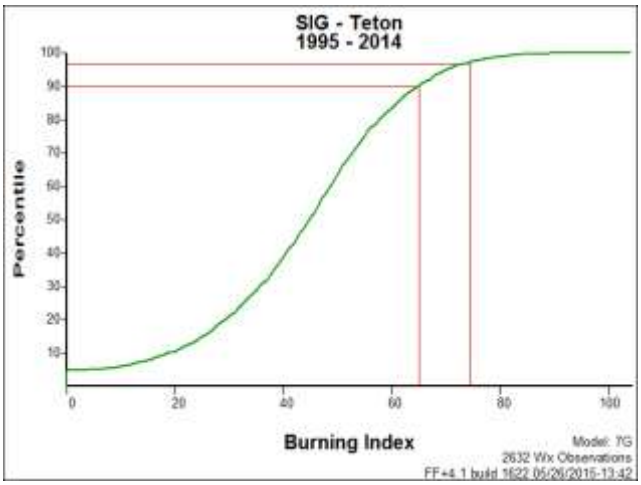


Figure 4



ERC Tracking and Standard Operating Procedures for posting

ERCs will be graphed approximately every 8-10 days from June1 through October 30. Significant weather events such as extended rainfall or a stretch of warm, dry days may prompt managers to update more frequently. ERCs will be graphed and posted on the Teton Interagency web site for the Teton SIG, as well as all RAWS weather stations.

- The period of record used will be 1993-2012
- Fire Season: June 1 – October 10
- Fuel Model G3P3 (1978)
- Analysis period of 3 days

Fire Family Plus will be used to maintain a current historical weather climatology file as well as construct the ERC graphs. The Fire Family plus historical weather "Date .mdb" file will be kept at FS fire ftp site (contact Forest or Park AFMO for address).

The current graphs will be saved as .jpg files (i.e "Burro.jpg") and placed on the TIDC web site.

Critical Fuels SOP

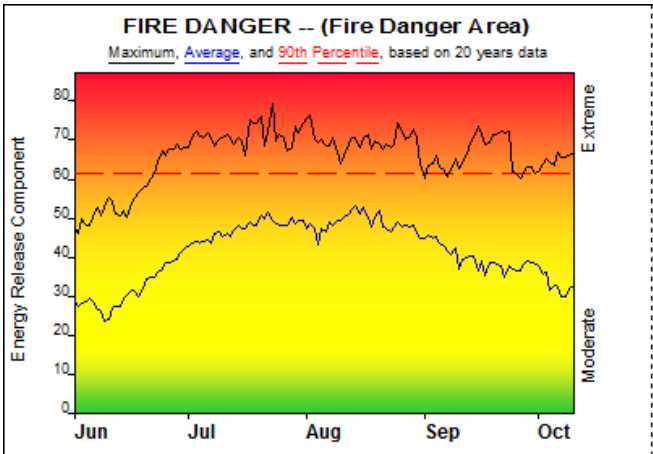
The critical fuels page on the EGBCC site is updated at least every seven days during fire season. This update is used by the weather service as one of the several criteria for issuing a red flag warning. Critical fuel determination is based on actual on the ground information, NFDRS, and expert opinion from on-the-ground personnel.

Routine updates are scheduled on Wednesday morning following the weekly GTNP/BT fire conference call. If the conference call does not occur, then the Park and Forest AFMO/ Duty Officers will determine the need for critical fuels flagging for the Dispatch area. Once it is determined that the area is considered in critical fuels, either Park or Forest representative will "flag" the fuels on the EGBCC critical fuels web site. The following criteria will be used as a guide for "critical fuels"

- 1,000 hour fuels less than 12%
- Woody fuels less than 90%
- Herbaceous fuels less than 50%
- Very active, fuels driven fire behavior

Pocket Cards

The Teton Pocket Card was updated in April 2015 and is valid through April 2017.



Fire Danger Area:

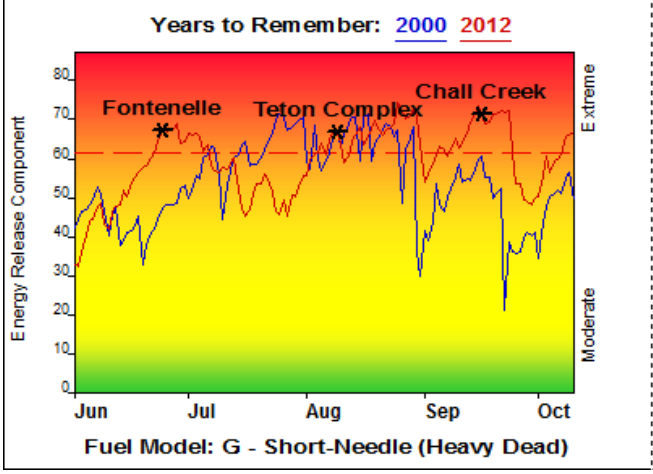
- Teton Interagency Zone
- NWS Zones 414, 415, 416
- Teton SIG
  * Meets NWCG Wx Station Standards

Fire Danger Interpretation:

EXTREME -- Use extreme caution
(Caution) -- Watch for change
Moderate -- Lower Potential, but always be aware

Maximum -- Highest Energy Release Component by day for 1995 - 2014
Average -- shows peak fire season over 20 years (2632 observations)
90th Percentile -- Only 10% of the 2632 days from 1995 - 2014 had an Energy Release Component above 61

Local Thresholds - Watch out: Combinations of any of these factors can greatly increase fire behavior: **20' Wind Speed** over 20 mph, **RH** less than 17%, **Temperature** over 86, **1000-Hour Fuel Moisture** less than 12 **Woody Fuels** less than 90%, **Herbaceous Fuels** less than 80%.



Remember what Fire Danger tells you:

- Energy Release Component gives seasonal trends calculated from 2 pm temperature, humidity, daily temperature & rh ranges, and precip duration.
- Wind is NOT part of ERC calculation.
- Watch local conditions and variations across the landscape -- Fuel, Weather, Topography.
- Listen to weather forecasts -- especially WIND.

Past Experience:

(Past and Local Experience)

Teton Complex - 2000: Lightning fires throughout the BTNF and GTNP in August (Boulder, Blind Trail, Fontenelle, Half Moon, Enos, Moran, Wilcox, Glade, Snowshoe).

Fontenelle- 2012 The warmest summer on record for WY. The Fontenelle and Bear Cub fires started in late June/early July. Other large fires burned actively into October (Butte Creek, North Buffalo, Horsethief Canyon, Chall Creek).

Responsible Agency: Bridger-Teton NF and Grand Teton NP
FF+4.1 build 1622 04/27/2015-13:08 (C:\Users\mbjohnston\Documents\Training\...\WYBTF)
Design by NWCG Fire Danger Working Team

Preparedness and Staffing

Preparedness and staffing are based on actual and predicted fire danger and fire management activity. For ease of understanding, preparedness and staffing levels are considered as one index for the Bridger-Teton National Forest and Grand Teton National Park. Specific staffing and management actions are listed below for each level. These same levels drive pre-planned dispatch actions.

Changes to the preparedness level are the responsibility of the Forest and Park Duty Officers, with input and/or recommendation from TIDC.

Determination of preparedness levels is based on three inputs:

- **The Energy Release Component (ERC) derived from a WIMS based Special Interest Group of fire weather stations (Teton SIG: Grand Teton, Snider, and Half Moon)**

Table 3

Stations	Staffing Class	ERC	Adj Fire Danger
Teton SIG Fuel Model G	I	0-15	Low
	II	15-32	Moderate
	III - Lo	32-46	High
	III - Hi	46-61	High
	IV	61-68	Very High
	V	68+	Extreme

ERC 90th percentile: 61 BI 90th percentile: 65
ERC 97th percentile: 68 BI 97th percentile: 74

TETON SIG indices updated spring 2014 calculated using 1995-2014 weather data in Firefamily Plus v4.1 , season June 1- October 10. *Half Moon RAWS data starts in 1997. Indices will be updated bi-annually in order to conform to local Pocket Card values.

- **The appropriate level selected from the Fire Activity Guidelines**

- **The indicators predicted for the Bridger-Teton predictive service area on the 7-Day Significant Fire Potential Outlook posted at the EGB Predictive Services site** (http://gacc.nifc.gov/egbc/outlooks.php)

Table 4

PREPAREDNESS / STAFFING LEVELS			
	Considerations		***Preparedness/Staffing Level***
NFDRS Staffing Class (ERC based)	**Fire Activity Guidelines**	**7-Day Significant Fire Potential Outlook** **Outlook for Bridger-Teton PSA generated by EGB Predictive Services**	***Level will be determined using a combination of the input variables.***
I	**< 2 active type 4 and 5 fires**	**Moist**	***1***
II	**2-5 type 4 and 5 fires, initial attack successful**	**Moist**	***2***
III-Lo	**Type 4 and 5 fires with some extended attack**	**Moist**	***3 Lo***
III-Hi	**Type 4 and 5 fires with some extended attack, 1 or 2 active type 3 fires. Some outside resources ordered**	**Dry**	***3 Hi***
IV	**Multiple starts resulting in, type 3, 4, 5 fires. Some fires requiring extended attack. One or two type 2 fires possible.**	**Dry** **or Very Dry with a predicted "Significant Weather Trigger"**	***4***
V	**Multiple starts with many requiring aggressive IA. Active type 1,2 or 3 fires. Outside resources required for large fire support and initial attack**	**Very Dry with a predicted "Significant Weather Trigger"**	***5***

Once an initial determination of the index based staffing level is made from NFDRS the two other indicators will be analyzed to decide if there are either current fire activity or significant fire potential variables that would justify selecting a higher or lower staffing level.

The Park and Forest Duty Officer may adjust the staffing level for the day should any of the following "Significant Weather Triggers" be predicted in the 7-Day Outlook or identified in the appropriate fire weather zone forecast.

Lightning Activity Level (LAL4, LAL5, LAL6)

Lightning activity level is a measurement of both the areal coverage of thunderstorms within the FW Zone and the relative dryness of the cells. Fire weather Forecasters use this scale when forecasting for *potential* lightning activity.

Red Flag Warning

Red Flag Warnings indicate that identified extreme weather criteria (coupled with critical fuels) are forecasted for the next 24 hour period or are already occurring. Fire weather watches are typically issued when red flag conditions are expected to develop in upcoming forecast periods. Red Flag Warning criteria are defined by NWS Office and contained in the current EGB/NWS Annual Operating Plan; http://gacc.nifc.gov/gbcc/aop.php

Extremely Dry Air mass

Relative humidity forecast to be 10% or less.

Haines Index

Haines Index days of 5 moderate or 6 high will be considered. Haines Index is related to the potential for large fire growth or erratic fire behavior, based on a measure of atmospheric instability coupled with the relative dryness of the airmass.

PREPAREDNESS / STAFFING PLAN GUIDELINES

The following are recommended preparedness activities and levels for the Bridger-Teton National Forest and Grand Teton National Park, based on resource availability.

Additional pre- and post-season staffing will be determined on a case-by-case basis by Forest and Park fire management officers.

Agency Duty Officers refers to the Forest or Park Duty Officer whereas Zone Duty Officer refers to each Zone of the Forest. Typically the Agency and Zone Duty Officer for Grand Teton National Park is the same person. When referring to engine coverage, Bridger-Teton NF North Zone and Grand Teton NP is managed together as one response zone.

Pre-Season Activity:

♦ See WIMS responsibilities on page 5

Annual Season Activity:

- June 1 – Begin 24 hour dispatch coverage. Teton Interagency Dispatch Center will maintain a list and contact numbers for assigned duty officers and notify appropriate staff.
- June 4 – Begin exclusive use period of first Type 3 helicopter
- June 15 – Teton Interagency Dispatch Center broadcasts daily fire management report. Aviation desk is staffed for all agency flight missions.
- June 17 – Initiate weekly coordination calls between Park/Forest Duty Officers and TIDC
- June 18 – Begin exclusive use period of second Type 3 helicopter
- June 23 – Local Type-3 Team rotation begins

PREPAREDNESS/STAFFING LEVEL I	
MANAGEMENT	
Management Recommendations	**Responsibility**
A. Ensure staffing levels are adequate	Agency/Zone Duty Officer
B. Morning check-in and status of all resources	Teton Dispatch
C. Fire Weather and Fire Danger Broadcast	Teton Dispatch
D. Fire Cache Manager M-F, on call schedule for weekends	Fire Staff
E. Forest Supervisor, Park Superintendent and District Rangers (or acting) identified and transmitted to Dispatch	Forest Supervisor, Park Superintendent
INITIAL ATTACK RESOURCES	
Management Recommendations	**Responsibility**
A. Maintain 1 engine per zone **(30 Minute Getaway)**	Agency/Zone Duty Officer
B. Maintain 1 Helicopter (IA Ready) on Forest/Park	Forest/Park Aviation Officer
C. Maintain 1 Duty Officer per zone and Forest/Park, weekend on call	Agency/Zone Duty Officer
D. Maintain 1 Strategic Operations Planner on Forest/Park	Agency Duty Officer

PREPAREDNESS/STAFFING LEVEL II	
MANAGEMENT	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Level I	
B. Air Patrol following lightning activity as appropriate	Agency/Zone Duty Officer
C. Consider increased staffing during periods of high use	Agency/Zone Duty Officer
D. Consider staffing of aviation desk daily and/or second Initial Attack Dispatcher	TIDC Manager
INITIAL ATTACK RESOURCES	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Level I **(30 Minute Getaway)**	
B. Maintain 1 engine per zone	Agency/Zone Duty Officer
C. Maintain 1 Helicopter per Forest/ Park	Forest/Park Aviation Officer
D. Maintain 1 Duty Officer per zone and Forest/Park (24 hour on call)	Agency/Zone Duty Officer
E. Maintain 1 Strategic Operations Planner on Forest/Park	Agency Duty Officer

PREPAREDNESS/STAFFING LEVEL III Low	
MANAGEMENT	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Levels I & II	
B. Consider: 7 day/staffing of fire cache Increased IA Capability Extended staffing of IA resources	Agency/Zone Duty Officer
C. Consider staffing of TIDC Aviation desk daily, or second Initial Attack Dispatcher	TIDC Center Manager
D. Brief agency administrator as needed	Agency Duty Officer
E. Evaluate crew and staff fatigue to determine if work/rest guidelines are met	Agency / Zone Duty Officer Agency Administrators
F. Consider order/assignment of dedicated Aviation Officer	Agency Duty Officer
INITIAL ATTACK RESOURCES	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Levels I & II (**15 Minute Getaway)**	
B. ICT3 available on 2 hour call for Park and Forest	Agency Duty Officer
C. Maintain 1 engine per zone	Agency/Zone Duty Officer
D. Maintain 1 Helicopter (IA Ready) per Forest/Park	Forest/Park Aviation Officer
E. Coordinate with adjoining agencies on available resources	Agency Duty Officer

PREPAREDNESS/STAFFING LEVEL III High	
MANAGEMENT	
Management Recommendations	**Responsibility**
G. Continue as in Preparedness Levels I & II	
H. Consider: 7 day/staffing of fire cache Increased IA Capability Extended staffing of IA resources Need for severity funding	Agency/Zone Duty Officer
I. Consider staffing of TIDC Aviation desk daily, or second Initial Attack Dispatcher	TIDC Center Manager
J. Brief agency administrator as needed	Agency Duty Officer
K. Consider and coordinate with other agencies the need for fire restrictions	Agency Duty Officer
L. Evaluate crew and staff fatigue to determine if work/rest guidelines are met	Agency / Zone Duty Officer Agency Administrators
M. Consider order/assignment of dedicated Aviation Officer	Agency Duty Officer
INITIAL ATTACK RESOURCES	
Management Recommendations	**Responsibility**
F. Continue as in Preparedness Levels I & II (**15 Minute Getaway)**	
G. ICT3 available on 2 hour call for Park and Forest	Agency Duty Officer
H. Maintain 2 engines per zone	Agency/Zone Duty Officer
I. Maintain 1 Helicopter (IA Ready) per Forest/Park	Forest/Park Aviation Officer
J. Maintain 1 Strategic Operations Planner on Forest and Park	Agency Duty Officer
K. Coordinate with adjoining agencies on available resources	Agency Duty Officer

PREPAREDNESS/STAFFING LEVEL IV	
MANAGEMENT	
Management Recommendations	**Responsibility**
N. Continue as in Preparedness Levels I, II, & III	
O. Expand support functions as appropriate	Agency Duty Officer
P. TIDC Aviation desk staffed daily, consider 2 Fire Dispatchers on daily	TIDC Center Manager
Q. Consider order/assignment of dedicated Aviation Officer	Agency Duty Officer
R. Activate Interagency Coordinator, with local agencies and GYA (county & state)	Agency Duty Officer
S. Daily briefing of agency administrator	Agency Duty Officer
T. Maintain one ICT3 per zone / park on call	Agency Duty Officer
U. Evaluate all planned and existing prescribed fires	Fire Staff
INITIAL ATTACK RESOURCES	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Levels I, II, & III (**10 Minute Getaway)**	
B. Maintain 2 Helicopters (IA ready) per Forest/Park	Agency Duty Officer
C. Consider preposition Air Attack and aircraft	Agency Duty Officer
D. Consider pre-identification and outfitting of “Teton Type II Crew” if not already assigned	Agency Duty Officer
E. Consider pre-positioning of additional hand crews, and overhead	Agency Duty Officer
F. Maintain 1 Strategic Operations Planner on Forest/Park	Agency Duty Officer

PREPAREDNESS/STAFFING LEVEL V	
MANAGEMENT	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Levels I, II, III, & IV	
B. Staff two Initial Attack Dispatchers	TIDC Center Manager
INITIAL ATTACK RESOURCES	
Management Recommendations	**Responsibility**
A. Continue as in Preparedness Levels I - IV **(10 Minute Getaway)**	
B. Consider 2 Duty Officers per zone	Agency Duty Officer
C. Mobilize Teton Crew, pre-position as needed	Agency Duty Officer
D. Maintain 1 Strategic Operations Planner on Forest/Park	Agency Duty Officer